

CLAIMS:

1. A portable power management system for providing power to a heater means in order to vapourize a chemical formulation into surrounding atmosphere, the system comprising:
- 5 pulse generation means for supplying energy pulses;
switch means connected to the pulse generation means and to the heater means, the switch means receiving the energy pulses from the pulse generation means;
the switch means further delivering to the heater means amplified energy pulses at a rate controlled by the pulse generation means in order to sufficiently heat the heater means to vapourize the chemical formulation;
- 10 wherein an initial pulse delivered to the heater means has a first portion and a second portion, the first portion having more energy than the second portion so that a predetermined temperature of the heater means is attained by delivery of the first portion and the temperature is substantially maintained by delivery of the second portion.
- 15
2. A system according to claim 1 further comprising processing means, to control the pulse generation means and thereby control the frequency of pulses delivered to the switch means.
- 20
3. A system according to claim 2 wherein the processing means varies the number of pulses delivered from the pulse generation means to the switch means over a preset period of time.
- 25
4. A system according to claim 3 wherein energy pulses supplied by the pulse generation means after the initial pulse each have the characteristics of the initial pulse.
- 30
5. A system according to claim 4 wherein the pulse generation means is a pulse width modulator.
6. A system according to claim 5 further comprising means for determining values of parameters of the heater means.

7. A system according to claim 6 wherein the means for determining includes a current sensor located in the processing means for determining the value of current through the heater means.
- 5 8. A system according to claim 7 wherein the means for determining further includes a resistive element, which combined with the value of current through the heater means, enables a value of voltage across the heater means to be determined.
9. A system according to claim 8 wherein the means for determining further
10 includes a negative temperature coefficient thermistor linked to the processing means for determining the temperature of the heater means.
10. A system according to claim 9 further comprising one or more batteries for supplying current to the system.
- 15 11. A system according to claim 10 further comprising voltage sensing means for sensing battery voltage of the one or more batteries,
12. A system according to claim 11 wherein an initial burst of energy pulses is
20 supplied by the pulse generation means to vapourize the chemical formulation rapidly and thereafter dropping the supply of energy pulses to the controlled rate.
13. A system according to claim 12 whereupon the heater means reaching the predetermined temperature initially, power consumption of the system is reduced to a
25 maintenance level and the battery voltage applied to the system is reduced.
14. A system according to claim 13 wherein the heater means is an impedance.
15. A system according to claim 14 wherein the heater means is a resistor.
- 30 16. A system according to claim 15 wherein the system is able to derive power from a mains supply instead of using power from the one or more batteries.
17. A method of providing power to a heater means in order to vapourize a
35 chemical formulation into surrounding atmosphere, the method comprising the steps of:

generating energy pulses to be received by switch means;

delivering amplified energy pulses from the switch means to the heater means at a controlled rate in order to heat the heater means to vapourize the chemical formulation;

5 wherein an initial pulse delivered to the heater means has a first portion and a second portion, the first portion having more energy than the second portion so that a predetermined temperature of the heater means is attained by delivery of the first portion and the temperature is substantially maintained by delivery of the second portion.

10

18. A method according to claim 17 further comprising the step of varying the number of pulses received by the heater means over a preset period of time.

15 19. A method according to claim 18 further comprising the step of controlling the width of the pulses and therefore the amount of energy delivered to the heater means.

20. A method according to claim 19 further comprising the step of controlling the frequency of pulses delivered to the switch means.

20 21. A method according to claim 20 wherein energy pulses generated after the initial pulse each have the characteristics of the initial pulse.

22. A method according to claim 21 wherein an initial burst of energy pulses are generated to vapourize the chemical formulation rapidly and thereafter the number of
25 pulses generated drops to the controlled rate.

30

23. A method according to claim 22 whereupon the heater means reaching the predetermined temperature initially, power consumption of the system is reduced to a maintenance level and the battery voltage applied to the system is reduced.

24. A system for monitoring parameters of a heater means where the heater means is supplied with energy pulses in order to vapourize a chemical formulation into surrounding atmosphere, the system comprising:

computer processing means;

35 power controller means for controlling delivery of the energy pulses to the heater means and for receiving data on the parameters;

wherein the computer processing means is linked to the power controller means such that the parameter data is able to be transmitted to the computer processing means for analysis and an initial pulse delivered to the heater means has a first portion and a second portion, the first portion having more energy than the second portion so that a predetermined temperature of the heater means is attained by delivery of the first portion and the temperature is substantially maintained by delivery of the second portion.

25. A system according to claim 24 wherein the computer processing means transmits commands to the power controller means.

26. A system according to claim 25 further comprising voltage sensing means for recording the voltage across the heater means.

27. A system according to claim 26 further comprising current sensing means for recording the current through the heater means.

28. A system according to claim 27 further comprising temperature sensing means for recording the temperature of the heater means.

29. A system according to claim 28 wherein one of the commands is a start command to start supply of power to the heater means.

30. A system according to claim 29 wherein the start command includes a digital value representative of the duration of an energy pulse in a period of time to be delivered to the heater means by the power controller means.

31. A system according to claim 29 wherein the start command includes a data log rate indicative of the number of transmissions of parameter data from the power controller means to the computer processing means in the period of time.

32. A system according to claim 28 wherein one of the commands is a stop command to cease supply of power to the heater means.

33. A system according to claim 32 wherein the stop command includes a digital value representative of the duration of no pulses in a period of time to be delivered to the heater means by the power controller means.

5 34. A system according to claim 32 wherein the power controller means is a microcontroller having a pulse generation means controlled by the microcontroller for delivering the energy pulses.

35. A system according to claim 34 further comprising switch means for amplifying the energy pulses at a rate controlled by the pulse generation means.

10

36. A system according to claim 35 wherein the parameters are any one or more of voltage, current or temperature of the heater means.

15 37. A method of monitoring parameters of a heater means where the heater means is supplied with energy pulses in order to vapourize a chemical formulation into surrounding atmosphere, the method comprising the steps of:

controlling delivery of the energy pulses to the heater means;

measuring and recording data on the parameters; and

transmitting the parameter data to a computer processing means for further

20 analysis;

wherein an initial pulse delivered to the heater means has a first portion and a second portion, the first portion having more energy than the second portion so that a predetermined temperature of the heater means is attained by delivery of the first portion and the temperature is substantially maintained by delivery of the second portion.

25

38. A computer program element comprising computer program code means to control a processing means to execute a procedure for monitoring parameters of a heater means where the heater means is supplied with energy pulses in order to vapourize a chemical formulation into surrounding atmosphere by:

30

controlling delivery of the energy pulses to the heater means;

measuring and recording data on the parameters; and

transmitting the parameter data to a computer processing means for further analysis;

35

wherein an initial pulse delivered to the heater means has a first portion and a second portion, the first portion having more energy than the second portion so that a

predetermined temperature of the heater means is attained by delivery of the first portion and the temperature is substantially maintained by delivery of the second portion.

- 5 39. A computer readable memory encoded with data representing a computer program for directing a processing means to execute a procedure for monitoring parameters of a heater means where the heater means is supplied with energy pulses in order to vapourize a chemical formulation into surrounding atmosphere by:

10 controlling delivery of the energy pulses to the heater means;
 measuring and recording data on the parameters; and
 transmitting the parameter data to a computer processing means for further analysis;

15 wherein an initial pulse delivered to the heater means has a first portion and a second portion, the first portion having more energy than the second portion so that a predetermined temperature of the heater means is attained by delivery of the first portion and the temperature is substantially maintained by delivery of the second portion.

- 20 40. A computer program element comprising computer program code means to control a processing means to execute a procedure for providing power to a heater means in order to vapourize a chemical formulation into surrounding atmosphere by:

 controlling the generation of energy pulses to be received by the heater means in order to heat the heater means to vapourize the chemical formulation; and

25 controlling the frequency of generated pulses received by heater means;
 wherein an initial pulse delivered to the heater means has a first portion and a second portion, the first portion having more energy than the second portion so that a predetermined temperature of the heater means is attained by delivery of the first portion and the temperature is substantially maintained by delivery of the second portion.

30